January 5, 1961

Mr. Paul D. Halley
Director of Industrial Hygiene
American Oil Company
910 South Michigan Avenue
Chicago 80, Illinois

Dear Paul:

In answer to the question in your letter of January 3 concerning possible cholinesterase inhibition from exposure to Pydraul AC, I am sure that if real acute exposures were severe enough or if less acute exposures were repeated long enough, there could be cholinesterase inhibition. Perhaps this could be said for any of the triaryl phosphates.

Several years ago, Kettering looked at a mixed triaryl phosphate formulation for us and compared it with a competitive product. A copy of the Kettering report is attached for your review. At the same time this work was under way, Kettering carried out a study with human volunteers in which known amounts of these materials were applied to the skin and allowed to remain for specified periods each day for fifteen days. Joe Treon reported the results of the human studies at the 1957 AIHA meeting in St. Louis. His draft of a final report (which we had hoped he might submit for publication) is still in the pile of reports sitting on the desk of Dr. Kehoe in Cincinnati, even though Joe has not been with Kettering for several years. Essentially, Joe's work showed no significant cholinesterase inhibition in the volunteers when 0.25 milliliters was maintained in contact with the skin for two hours in the morning and again two hours in the afternoon, five days a week for several weeks. Although this may not sound like a large amount from a practical standpoint, we felt it represented a reasonable exposure. If you can envision this same amount of glycerin being applied to the skin and allowed to remain, you will have an idea of the amount of oily material involved. In other words, we felt that workmen doing any kind of a job would be unlikely to tolerate such amounts of material on the skin or would be unable to perform their jobs because of slippery hands.

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I am sure you have seen the work reported by the Navy in which men using triaryl phosphate hydraulic fluid aboard an aircraft carrier were studied (Archives of Industrial Health, Volume 20, page 258, 1959). Here again, phosphate oil or fluid which caused significant cholinesterase inhibition in the laboratory investigations caused no effect in aircraft carrier personnel. The report points out that exposure was limited.

It is our impression that any normal exposures to Pydraul AC would not cause cholinesterase inhibition. As far as abnormal or unexpected exposures are concerned, we would not expect any significant cholinesterase inhibition without other symptoms of toxicity. If the exposure was such that there might be cholinesterase inhibition without any symptoms due to unusual exposures, it is our feeling that the inhibition would be transient and of no great consequence.

Sincerely yours,

Elmer P. Wheeler
Assistant Director
Medical Department

EPW:dh
Enclosure